

U.S. EPA Region 10 Field Technical Support  
Mountain Home Air Force Base – Asbestos  
Final Report – March 28, 2008

Prepared by:

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## **Introduction**

The United States Environmental Protection Agency (EPA) Region 10 Office of Compliance and Enforcement (OCE) requested technical assistance from the EPA Office of Environmental Assessment (OEA), to conduct an investigation of asbestos releases at building demolition/construction sites and at the Verlinde Hills Debris Field at Mountain Home Air Force Base (AFB) in Mountain Home, Idaho. The investigation was conducted between November 15, 2007 and March 14, 2008 and involved site visits, sampling and analysis, and document review. The primary purpose for the investigation was to determine if Mountain Home AFB is in compliance with the Clean Air Act (CAA) and other relevant federal environmental statutes and regulations.

## **Background**

The Department of Defense (DOD) started replacement of military housing at Mountain Home AFB in 2004. The Seattle District of the U.S. Army Corp of Engineers (USACE) manages the 5-year multi-phased program (Phases I-VIII) which involves demolition of old housing and construction of over 1,100 new family housing units.

On September 18, 2007, an OEA field team (Andy Hess and Jed Januch) visited Mountain Home AFB to do environmental sampling at the request of investigators from the DOD Inspector General's office. The team observed several fragments of cement pipe scattered on the ground at the Phase VII building demolition and construction site and at the Verlinde Hill Debris Field. Samples of the cement pipe were collected at both sites. Analysis of the samples revealed that the cement pipe contained both chrysotile and crocidolite asbestos at a concentration greater than 1%.<sup>1</sup>

## **Asbestos**

Asbestos is a commercial term used to describe a group of silicate minerals belonging to the serpentine or amphibole groups which have crystallized in the asbestiform habit. Asbestos is defined in 40 CFR Part 61 as meaning the asbestiform varieties of chrysotile (serpentine); crocidolite (asbestiform riebeckite), amosite (asbestiform cummingtonite-grunerite); and tremolite; anthophyllite, and actinolite. Category II non-friable asbestos-containing material (ACM) is any material, such as asbestos-cement pipe, that contains greater than 1% asbestos. Regulated asbestos containing material (RACM) includes Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.

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<sup>1</sup> U.S. EPA Region 10, Field Technical Support Document, Mountain Home Air Force Base (unpublished report). September 2007.

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**Cement Asbestos Pipe – Transite**

Cement asbestos pipe is composed of Portland cement, aggregate material, and asbestos (typically between 15-25%). Cement asbestos pipe is classified under the asbestos NESHAP as category II non-friable ACM. It can become RACM when it becomes friable or has a high probability of becoming or has become crumbled, pulverized, or reduced to a powder by the forces expected to act on the material during the course of demolition or renovation. Cutting, breaking, or crushing cement asbestos pipe with mechanical trenching equipment will cause it to become RACM. Further, the burial in place of cement asbestos pipe that had been crushed during the course of demolition or renovation activities would cause the locations to be considered active waste disposal sites subject to federal regulation.<sup>2</sup> Over time, the weathering of cement asbestos pipe will increase the potential release of asbestos fibers from the cement matrix.

**Sources of Cement Asbestos Pipe at Mountain Home AFB**

A Hazardous Building Materials Survey for the Phase VII housing conducted in 2004 by Hart Crowser, Inc. identified asbestos containing building material (ACBM) in the housing units at Mountain Home AFB.<sup>3</sup> The types of ACBM identified included insulation, caulk, cement asbestos board (CAB), mastics, ceiling and roofing materials. It also identified heater duct under the concrete slab foundation of the buildings as ACBM. The material was assumed to be asbestos containing based on review of as-built figures at Mountain Home AFB. The material was not sampled for analysis in order to preserve the building heating system integrity. Hart Crowser, Inc. estimated approximately 500 linear feet of 8-inch cement asbestos heater duct per housing unit.

A limited asbestos inspection, conducted in 2005 by AC&G Environmental Services Inc., identified a variety of ACBM in the Phase VI housing including the transite heater duct.<sup>4</sup> Analysis of the heater duct revealed that it contained 8% crocidolite and 7% chrysotile asbestos. The report estimated 71,000 linear feet of cement asbestos heater duct in the Phase VI housing.

Another source of transite pipe not addressed in either the Phase VII survey or the Phase VI inspection was transite water and sewer pipe located below the ground surface. Air Force topographical and utility maps produced in 1967 show a network of cement asbestos pipes in various diameters (such as 4-inch, 6-inch, 8-inch, and 10-inch) used for

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<sup>2</sup> Rasnic, John B. Director of Stationary Source Compliance Division, U.S. EPA Office of Air Quality Planning and Standards. Letter to Mr. Joseph L. Perez regarding Asbestos Cement Pipe Disposal. July 17, 1991.

<sup>3</sup> U.S. Army Corp of Engineers, Hazardous Building Material Survey Report – Phase VI Housing – Oasis/Presidential Acres Mountain Home AFB Contract Number DACA67-02-D-2002, August 26, 2004.

<sup>4</sup> AC&G Environmental Services, Inc. Limited Asbestos Inspection, Phase VI, 142 Residential Dwelling Unit Demolition, Mountain Home Air Force Base, Mountain Home, Idaho, DACA67-02-D-2012, May 9, 2005.



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water distribution and sanitary sewer lines.<sup>5</sup> Notes in the USACE Demolition Plan 1, Plate No. C-102, and Demolition Plan 2, Plate No. C-103, state “An older asbestos concrete water distribution system not shown on drawings within the Phase VII area has been abandoned in place.”<sup>6</sup>

**November 2007- EPA Site Visit**

On November 15-16, 2007, a team of investigators from the EPA and the Idaho Department of Environmental Quality (IDEQ) conducted an inspection at Mountain Home AFB to determine the extent of the asbestos release discovered in September 2007. EPA was represented by Jed Januch and the IDEQ was represented by Eileen Loerch, Nichole Deinarowicz, and Michael Spomer. Accompanying the team was Special Agent David Berrett of the Department of Defense Office of the Inspector General, and Special Agents Matt Peltier and Allison Angel of the Air Force Office of Special Investigations. The team documented observations during the site visit with digital photographs. The digital photographs taken by EPA are displayed in Figures 1-41 in Appendix 1 of this report. An additional 32 digital photographs taken by IDEQ and are included in Appendix 2.

**November 15, 2007 - Phases VI & VII**

Before the site visit began, the EPA and IDEQ officials conducted an opening conference with officials from the Mountain Home AFB including:

Lt Col Tim Wood	Mt. Home AFB/CES	(208) 828-6353
Nathan Rowland	Mt. Home AFB/CES	(208) 828-6353
Paula Jo Brown	Mt. Home AFB/CES/Env. Flight	(208) 828-6666
Curtis Olsen	Mt. Home AFB/CES/Env. Flight	(208) 828-1684
Bryan Trimberger	Mt. Home AFB/CES/Env. Flight	(208) 828-3724
Pam Dugger	Mt. Home AFB	(208) 828-2288
Megan Keller	Mt. Home AFB/CES/Env. Flight	(208) 828-1784
Mark Slowminski	USACE	(208) 832-4342 ext. 2015

The inspection team showed identification and explained the reason for the inspection was to follow up to the discovery of the asbestos release discovered at Mountain Home AFB in September 2007. It was also during this time that the inspection team requested several documents and maps. Copies of these materials were supplied to IDEQ and EPA either during the inspection or sent at a later date.

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<sup>5</sup>Department of the Air Force, Tactical Air Command, Master Plan, Topographical and Utility Maps. Mountain Home Air Force Base, Mountain Home, Idaho. May 1, 1967.

<sup>6</sup> U.S. Army Corps of Engineers Seattle District, Mountain Home Family Housing Phase VII Demolition Plan 1&2, Plate Numbers C-102 and C-103, Mountain Home AFB PN QYZH88-7176, Idaho. 03May06.

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During the inspection of the military housing demolition and construction sites, the weather conditions were partly cloudy, variable wind, with no precipitation. The inspection team observed two workers (Kevin Moser and Joe Spurgeon) from an asbestos abatement contractor called Asbestos Abatement, Inc., (AAI) on the site retrieving fragments of cement asbestos pipe off the ground.

The workers were wetting the fragments with a garden sprayer and placing them in a plastic bag. During the cement asbestos pipe retrieval, the workers were wearing coveralls, half-face air purifying respirators, and personal monitoring pumps. The workers placed the filled plastic bags of wet cement asbestos pipe into a plastic lined bed of a tandem trailer (Idaho plate #LE 7660). The trailer was placarded with a warning signs on the metal side boards.

The inspection team observed one of the two satellite locations where asbestos pipe was being stored for disposal. This was located in a storage unit (D) on the Phase VI site near the portable trailers used for Parsons Construction offices. It was noted that the front surface of the door was placarded with an 8½ x 11 inch asbestos warning sign. The inspection team requested that the workers open the door and allow them to observe the material stored in the room. Inside storage unit D, the inspection team observed a stack of dry cement asbestos pipe sections laying on a plastic tarp on the surface of the floor. The workers quickly put their respirators on, entered the storage unit, and pulled the plastic tarp over the top of the sections of pipe. A short time after the workers came out of the storage unit they entered the Parsons Construction offices. They did this while dressed in the same coveralls they wore inside the storage unit without performing decontamination.

While observing the AAI workers, the inspection team had the opportunity to visit with Dale Lundy of Industrial Hygiene Resources, Inc. (IHR). He was responsible for managing the personal air monitors on the workers and deploying stationary air monitors in the areas where the AAI workers were picking up the cement asbestos pipe fragments. According to Dale Lundy, up to that point, no asbestos fibers had been detected in the personal and stationary air monitoring samples collected at Mountain Home AFB. He said that the method of analysis used for all the samples was NIOSH 7400 – asbestos by phase contrast microscopy (PCM).

While inspecting the Phase VI site, the inspection team observed numerous fragments of cement asbestos pipe on the surface of the ground. The broken pipe fragments were marked with green colored flags. The cement asbestos pipe fragments appeared gray in color with white and blue colored fiber bundles protruding from the broken edges.

The inspection team also visited Phase VII where the AAI workers had already picked up the fragments off the surface of the ground. The locations of the cement asbestos pipe fragments at Phase VII were marked with orange colored flags or were



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painted with orange colored paint. While inspecting the Phase VII site the inspection team observed fragments of cement asbestos pipe on the ground in the area that had been cleaned earlier in the day by the AAI abatement workers. The inspection team also observed a large piece of pipe sticking out of the wall of the trench about 2 ft. below the ground surface where a foundation for a new housing unit had been excavated.

During the inspection of Phase VII, a USACE representative (James La Fleur) showed the inspection team the rock screen and sifting equipment and explained how it worked. The rock screen was a large metal structure with grates that were approximately 1 ft. apart. Loads of material (mixed rock, building material, and dirt) are picked up with a bucket loader and put through this first screen that separates material larger than 1 ft. in diameter. The material that passes the 1 ft. grate is picked up with the bucket loader and put into the sifter which mechanically agitates and screens debris such as rocks from the soil. There was a large pile of rocks and a couple of large piles of sifted soil near the sifting equipment. According to the USACE representative, the material in the rock pile was the same type of material transported and dumped at the Verlinde Hill Debris Field. The sifted soil would be retained on the construction site to be used as fill. There were several fragments of cement asbestos pipe in the pile of rock near the sifting equipment.

With the exception of the pipe fragments being retrieved by the AAI abatement workers at Phase VI, the pipe fragments we observed at Phases VI and VII appeared to be relatively dry. Figure 42 shows a few of the locations where the inspection team observed cement asbestos pipe at the Phase VI and Phase VII construction and demolition sites.

November 16, 2007 – Verlinde Hill Debris Field

During the inspection of the Verlinde Hill Debris Field, the weather conditions were partly cloudy, with variable wind, and light rain before the inspection and during the last half of the inspection at this site. The inspection team consisted on Jed Januch representing EPA and Nichole Deinarowicz and Mike Spomer representing IDEQ. While at the Verlinde Hill Debris Field, the inspection team took digital photographs while collecting samples.

The inspection team observed the contents of the rubble pile at Verlinde Hill is made up mostly of rock and construction debris including chunks of broken concrete, asphalt, and pieces of cement asbestos pipe. Numerous fragments of cement asbestos pipe are on the surface of the debris field and scattered on the top, middle, and bottom of the pile on the north, east, and south sides. The pipe fragments appeared relatively dry except for when it started to rain during the site visit. Figure 43 shows a few of the locations where the inspection team observed cement asbestos pipe at the Verlinde Hill Debris Field.

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**Asbestos Sampling and Laboratory Analysis**

The sampling and analysis was done according to a QAPP approved by Mr. Don Matheny, U.S. EPA Region 10 Quality Assurance Chemist, on November 14, 2007. A copy of the QAPP and the associated approval memo are included in Appendix 3.

Eleven bulk samples of cement asbestos pipe were collected at Mountain Home AFB on November 15-16 2007. Six of the bulk samples were collected at the Phase VI and VII building sites and five of the bulk samples were collected at the Verlinde Hill Debris Field. The sample locations were documented with global positioning system (GPS) data acquired with a Ricoh model Capilo 500SE digital camera. The GPS data has been plotted on aerial images/maps which are included at the end of Appendix 1. Figure 44 shows the location of the samples collected at the Phase VI and Phase VII sites. Figure 45 shows the location of the samples collected at the Verlinde Hill Debris Field.

While collecting samples at the Verlinde Hill Debris Field, members of the field team (Mike Spomer and Jed Januch) wore Tyvek® suits, vinyl gloves, full-face air purifying respirators with P-100 HEPA cartridges, and Gilian® personal air monitoring pumps. The air monitoring pumps were connected with Tygon tubing to 0.8 µm mixed cellulose ester (MCE) filter cassettes. Two air samples were collected for the purpose of monitoring potential asbestos exposure while sampling.

The samples of cement asbestos pipe were collected as grab samples. The samples were placed inside new 6 mil re-sealable plastic bags. The personal air monitoring samples were collected over 83 minutes duration at a flow rate of 1,683 cubic centimeters (cc) per minute for sample 07464306 and 2,528 cc/minute for sample 07464307. The personal sampling pumps were calibrated using a Gilian® electronic soap-film meter with a personal monitoring flow cell, serial number 002598-S. The bulk samples and personal air monitoring samples were packaged in a plastic cooler which was sealed closed with duct tape and EPA Region 10 custody seals.

Both the bulk cement asbestos pipe samples and the personal air monitoring samples were shipped under chain of custody via commercial delivery service (Federal Express – Air bill Number 8627 8187 7120) to the EPA Region 10 Laboratory in Port Orchard, Washington. The personal air monitoring samples were hand-delivered by EPA (Jed Januch) from the EPA Region 10 Laboratory to Lab/Cor, Inc., located in Seattle, Washington.

Chrysotile asbestos and crocidolite asbestos (asbestiform riebeckite) was detected in all of the bulk samples of cement asbestos pipe collected on November 15-16, 2007, at Mountain Home AFB. The analytical method used was EPA 600/R-93/116, titled: Test Method for the Determination of Asbestos in Bulk Building Materials. The method employs analysis by polarized light microscopy (PLM) and x-ray diffraction (XRD).



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Five of the samples (07464300, 07464303, 07464305, 07464310, and 07464311) were analyzed by PLM after gravimetric matrix reduction resulting in a quantitative result between 8% and 15 % chrysotile asbestos and 1% and 10 % crocidolite asbestos. Six of the samples (07464301, 07464302, 07464304, 07464308, 07464309, and 07464312) were analyzed by PLM without gravimetric matrix reduction resulting in a qualitative estimate of greater than 1% total asbestos.

A consolidated list of the results of analysis for the samples associated with this project is summarized in Table 1. Copies of the reports of analysis and related quality assurance narratives are included in Appendix 4.

**Table 1 Results of Analysis**

Sample Number	PLM Result			PLM Duplicates	XRD Results <sup>2</sup>	Personal Monitor TEM result
	Mineral	Quant	Qualitative Estimate			
07464300	chrysotile crocidolite	10-15% 5-10%		R-10 QA duplicate analysis chrysotile 8-12% crocidolite 1-5%	chrysotile <b>Minor</b> crocidolite <b>Trace</b>	
07464301	chrysotile crocidolite		>1% asbestos			
07464302	chrysotile crocidolite		>1% asbestos			
07464303	chrysotile crocidolite	10-15% 1-5%		NEIC QA Inter- laboratory Result chrysotile 6.5% crocidolite 10%		
07464304	chrysotile crocidolite		>1% asbestos			
07464305	chrysotile crocidolite	10-15% 1-5%				
07464306						ND
07464307						ND
07464308	chrysotile crocidolite		>1% asbestos			
07464309	chrysotile crocidolite		>1% asbestos			
07464310	chrysotile crocidolite	8-12% 1-5%			chrysotile <b>Trace</b> crocidolite <b>Trace</b>	
07464311	chrysotile crocidolite	8-12% 5-10%				
07464312	chrysotile crocidolite		>1% asbestos			

<sup>1</sup> PNQ – The asbestos was present but not quantified by gravimetric matrix reduction.

<sup>2</sup> XRD results are reported as approximately greater than 20% by weight for major, 5-20% for minor, and less than 5% for trace amounts.

The personal air monitoring samples were analyzed by Lab/Cor, Inc. using Method NIOSH 7402 entitled Asbestos by TEM (transmission electron microscopy). Lab/Cor, Inc. did not detect asbestos fibers in either of the personal air monitoring samples. It is important to note that during the sampling period the surface of the ground



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was damp from recent precipitation and the physical retrieval, by hand, of cement asbestos pipe fragments off the surface of the ground is a relatively low impact activity.

For quality assurance purposes, a duplicate bulk sample (07464303) was sent for analysis by PLM at the U.S. EPA National Enforcement Investigations Center (NEIC) in Denver, Colorado. The analysis revealed 6.5% chrysotile asbestos and 10% crocidolite asbestos in sample 07464303. In addition, two duplicate bulk specimens (07464300 and 07464310) were analyzed by XRD to verify the mineral identification by PLM. The presence of the minerals clinochrysotile (chrysotile) and riebeckite (crocidolite) were confirmed by XRD analysis of samples 07464300 and 07464310.

The fragments of cement asbestos pipe collected at Mountain Home AFB contain greater than 1% asbestos by weight. The action of cutting, breaking, or crushing the cement asbestos pipe with mechanical trenching equipment caused it in some cases to become friable. The final analytical report includes a narrative that describes the asbestos analysis by stereomicroscope and polarized light microscopy for the samples collected at Mountain Home AFB. The narrative includes two images (Figures 1 and 2, Appendix 4) that display fragments that show numerous asbestos fiber bundles protruding from the broken surfaces of the cement asbestos pipe samples.

#### **Records Review, Licensing, and Certification**

The USACE provided EPA and IDEQ with numerous copies of asbestos waste shipment records for transite pipe and other ACM shipped from Mountain Home AFB. The generator section of the forms typically listed the different housing developments as the work sites, such as Presidential Acres or Oasis Housing. The operator's name was Asbestos Abatement, Inc., and the Waste Disposal Site was Idaho Waste Systems, Inc. Simcoe Road Regional Landfill. The forms also described the waste materials and the quantities being transported and disposed of. I reviewed several copies of the waste shipment records and did not identify any discrepancies.

AAI is a licensed asbestos abatement contractor (License #12442-B-3) in the State of Idaho. The AAI workers observed by EPA working at Mountain Home AFB in November 2007 were currently certified, fit-tested, and enrolled in medical monitoring. Copies of the certification and related documents are included in Appendix 5.

#### **Conclusions**

1. Old underground cement asbestos (transite) water and sanitary sewer pipe in Phases VI and VII of the Mountain Home AFB military housing redevelopment sustained damage during trenching operations.
2. Cement asbestos pipe was rendered friable as a result of the mechanical forces associated with the cutting of underground pipe with trenching equipment and being driven on with heavy equipment.

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3. Fragments of cement asbestos pipe were observed on the ground within the Phase VI and VII construction sites in November 2007.
4. Samples of cement asbestos pipe collected at the Phase VI and VII construction sites were analyzed and found to contain chrysotile and crocidolite asbestos at concentrations greater than 1%.
5. Rock and construction debris (including concrete, asphalt, and fragments of cement asbestos pipe) were transported by dump truck from the Phase VI and VII construction sites and deposited at the Verlinde Hill Debris Field.
6. Fragments of cement asbestos pipe were observed on the ground at the Verlinde Hill Debris Field November 2007.
7. Samples of cement asbestos pipe collected at the Verlinde Hill Debris Field were analyzed and found to contain chrysotile and crocidolite asbestos at concentrations greater than 1%.